



NBA on TNT NLP:  
Still more interesting than Shaq

**Nate Chamness and Jacob Bustamante**

# Overview

Natural language generation of textual commentary for an NBA basketball game

# “Enhancing Real-Time Sports Commentary Generation with Dramatic Narrative Devices”, Martin Rhodes, Simon Coupland, and Tracy Cruickshank (ICIDS 2010)

Domain specific knowledge is formalized  
(Heavy influence in our system)

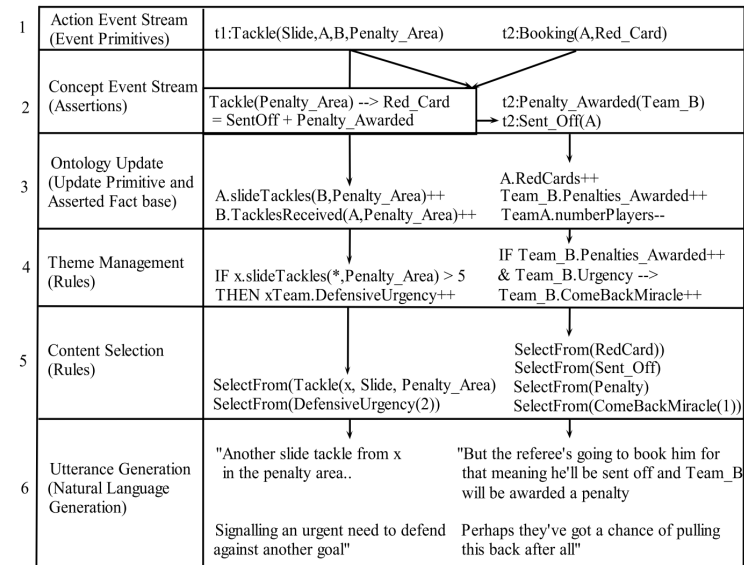


Fig. 2. Example flow diagram of the architecture

# “Automated Story Selection for Color Commentary in Sports”, Greg Lee, Vadim Bulitko, and Elliot A. Ludvig (TCIAIG 2013)

- Machine learn a mapping game state to prospective story
- Uses statistical based play by play and story based color commentary

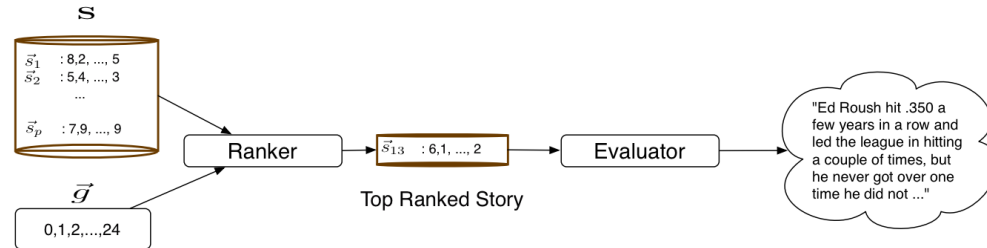


Fig. 1. SCoReS chooses a story to output to a commentator.

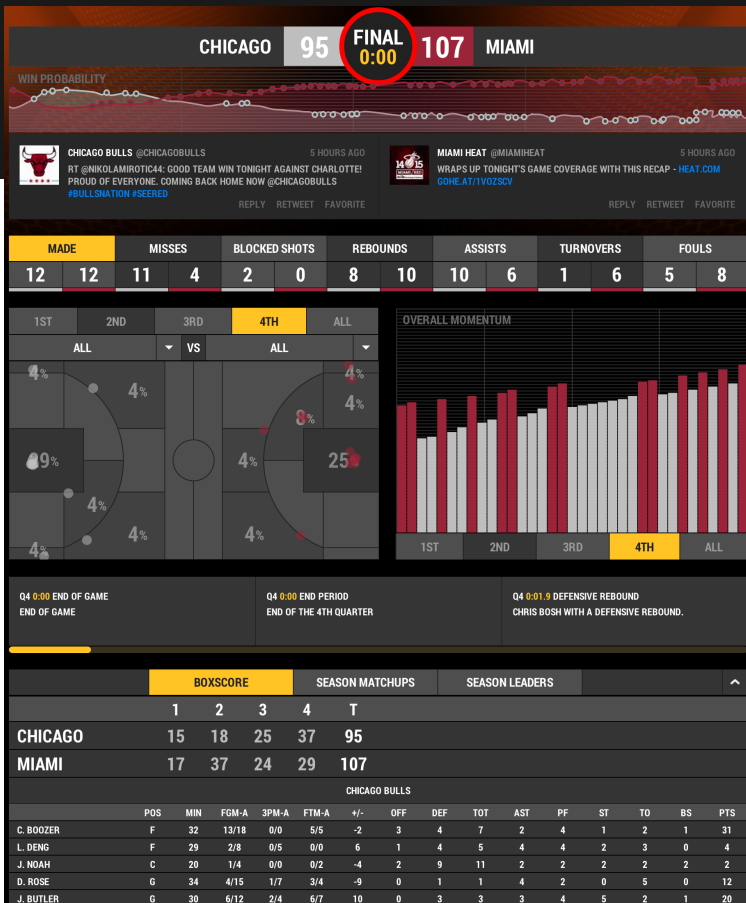
# Process Overview

1. Scrape sports webpages for game data, player info, and play-by-play events.
2. Iterate through a game's events and use a bidding structure to choose the type of commentary to generate.
3. Bids use predefined templates as the generated textual commentary.

# Parsing Process

1. Parse 2013-14 NBA csv schedule to download FoxSports raw html for game pages
2. The game data that we want (play by play, player info, etc.) is json format. Using `json.loads` we create a Python object in the structure of the json
3. Parse each play into columns (`primary_player`, `play_type`, `points_worth`, etc.) to insert into our sqlite database.
4. Now it is easy to write SQL queries to get information for our commentary.

# Original Page



```
<a href="#" class="control next disabled"><i class="arrow"></i></a>
</script>
```

```
<script type="text/javascript" src="https://www.google.com/jsapi"></script>
<script>
var nba = {};
nba.apiClient = "http://api.nba.onetwosee.com";
nba.socialClient = "http://api.social.onetwosee.com";
nba.socialCustomer = "fox";
nba.config = "fox";
nba.assetURL = "http://77bcef103281ab2577c0-9b2bb86ff62614bf5c38ae2e0781cccl.r49.cf2.rackcdn.com";
nba.initialUpdate = {"league":{"id":"527045fc6ba091f92dec1719","local-game-date":{"year":"2013","month":"10","date":"29","id":"1349074"},"gametype":{"id":"1","type":"Regular Season"},"stadium":{"name":"Bankers Life Fieldhouse","city":"Indianapolis","status":"Final","status-id":"4","quarter":"4","minutes":"0","seconds":"00","segment-number":"4","active-state":"false"},"last-1":{"global-player-id-1":"","player-id-1":"","global-team-code-1":"19","team-code-1":"","team-alias-1":"Orl","first-name-2":"alias-2":"Orl","first-name-3":"","last-name-3":"","global-player-id-3":"","player-id-3":"","global-team-code-3":"11","team-code-id":"","detail-description":"","distance":"","x-shot-coord":"","y-shot-coord":"","fastbreak":"","in-paint":"","second-chance":"","fouls":"26","home-fouls":"13","textual-description":"End of the 4th Quarter"},"visiting-team":{"team-name":{"name":"Magic","ali":{"wins":"0","losses":"1","pct":".000"},"linescore":{"score":"87","full-timeouts-left":"1","short-timeouts-left":"0","quarter":{"quarter":"3","score":"20","team-fouls":"9"},"quarter":"4","score":"23","team-fouls":"6"}}},"home-team":{"team-name":{"name":{"wins":"1","losses":"0","pct":"1.000"},"linescore":{"score":"97","full-timeouts-left":"2","short-timeouts-left":"1","quarter":{"quarter":"3","score":"29","team-fouls":"2"},"quarter":"4","score":"28","team-fouls":"4"}}},"date":"2013-10-29","time":"19:04","year":"2013","month":"10","date":"29","day":"2","local-time":{"hour":"20","minute":"00"},"gamecode":{"code":"2013102914","glArena":"city":"Miami","state":"Florida","country":"United States","global-id":"14","id":"14"},"coverage":{"level":"1"},"gamestate":"false"},"last-play":{"quarter":"4","time-minutes":"0","time-seconds":"00","id":"453","first-name-1":"","last-name-1":"","name-2":"","last-name-2":"","global-player-id-2":"","player-id-2":"","global-team-code-2":"4","team-code-2":"","team-alias-2":"3":"14","team-code-3":"14","team-alias-3":"Mia","points-type":"","event-id":"15","event-description":"End Period","detail-id":"chance":"","off-turnover":"","player-score":"0","player-fouls":"0","visitor-score":"95","home-score":"107","visitor-fouls":"27":{"name":"Bulls","alias":"Chi","team-city":{"city":"Chicago"},"team-code":{"global-id":"4","id":"4"},"record":{"wins":"0","loss":{"quarter":"1","score":"15","team-fouls":"6"},"quarter":"2","score":"18","team-fouls":"8"},"quarter":"3","score":"25","team":{"name":"Heat","alias":"Mia","team-city":{"city":"Miami"},"team-code":{"global-id":"14","id":"14"},"record":{"wins":"1","losse":{"quarter":"1","score":"17","team-fouls":"3"},"quarter":"2","score":"37","team-fouls":"6"},"quarter":"3","score":"24","team":{"id":"527045fc6ba091f92dec171a","local-game-date":{"year":"2013","month":"10","date":"29","day":"2"},"local-time":{"hour":"19Season":"stadium":{"name":"Staples Center","city":"Los Angeles","state":"California","country":"United States","global-id":"13id":"4","quarter":"4","minutes":"0","seconds":"00","segment-number":"4","active-state":"false"},"last-play":{"quarter":"4","timid-1":"","global-team-code-1":"12","team-code-1":"LAC","first-name-2":"","last-name-2":"","global-player-id-3":"","last-name-3":"","global-player-id-3":"","player-id-3":"","global-team-code-3":"13","team-code-3":"13","team-alias-3":"LAdescription":"","distance":"","x-shot-coord":"","y-shot-coord":"","fastbreak":"","in-paint":"","second-chance":"","off-turnoverfouls":"23","textual-description":"End of the Game"},"visiting-team":{"team-name":{"name":"Clippers","alias":"LAC"},"team-city":{"wins":"0","losses":"1","pct":".000"},"linescore":{"score":"103","full-timeouts-left":"2","short-timeouts-left":"0","quarter":{"quarter":"3","score":"22","team-fouls":"5"},"quarter":"4","score":"24","team-fouls":"7"}}},"home-team":{"team-name":{"name":{"wins":"1","losses":"0","pct":"1.000"},"linescore":{"score":"116","full-timeouts-left":"2","short-timeouts-left":"1","quarter":{"quarter":"3","score":"20","team-fouls":"6"},"quarter":"4","score":"41","team-fouls":"5"}}},"date":"2013-10-29","time":"22:3{"global-id":"1","name":"National Basketball Assoc.","alias":"NBA","display-name":"","season":{"season":"2013"},"nba-boxscore
```

# DB Schema

Primary table is play\_by\_play

```
1 drop table if exists play_by_play;
2
3 create table play_by_play (
4   id integer not null primary key autoincrement,
5   game_id integer references game(id),
6   quarter integer,
7   minutes integer,
8   seconds integer,
9   home_score integer,
10  away_score integer,
11  team_id integer references team(id),
12  description text,
13  event_description text,
14  detail_description text,
15  play_type text default 'other',
16  primary_player text,
17  secondary_player,
18  shot_type text,
19  shot_made text,
20  shot_distance integer,
21  x_coord real,
22  y_coord real,
23  rebound_type text,
24  foul_type text,
25  timeout_type text,
26  turnover_type text,
27  points_worth integer,
28  p_player_id integer references player(foxsports_id),
29  s_player_id integer references player(foxsports_id)
30 );
31
32 drop table if exists game;
33 create table game (
34   id integer primary key autoincrement,
35   season text,
36   game_date date,
37   home_team integer references team(id),
38   away_team integer references team(id),
39   game_type text,
40   home_score integer,
41   away_score integer,
42   stadium integer references stadium(id),
43   game_code integer
44 );
45
46 drop table if exists stadium;
47 create table stadium (
48   id integer primary key autoincrement,
49   name text,
50   country text,
51   state text,
52   city text,
53   fox_id integer,
54   unique(name, city)
55 );
56
57
58 drop table if exists team;
59 create table team (
60   id integer primary key,
61   city text,
62   alias text,
63   name text,
64   division text,
65   unique(alias)
66 );
```



# Commentary Generation

We have modules that bid to display commentary. Rare and relevant events get higher priority.

A bid consists of:

- score (0-1)
- list of commentary template strings
- current play object to fill the template. We add useful information to the play object resulting from our queries.

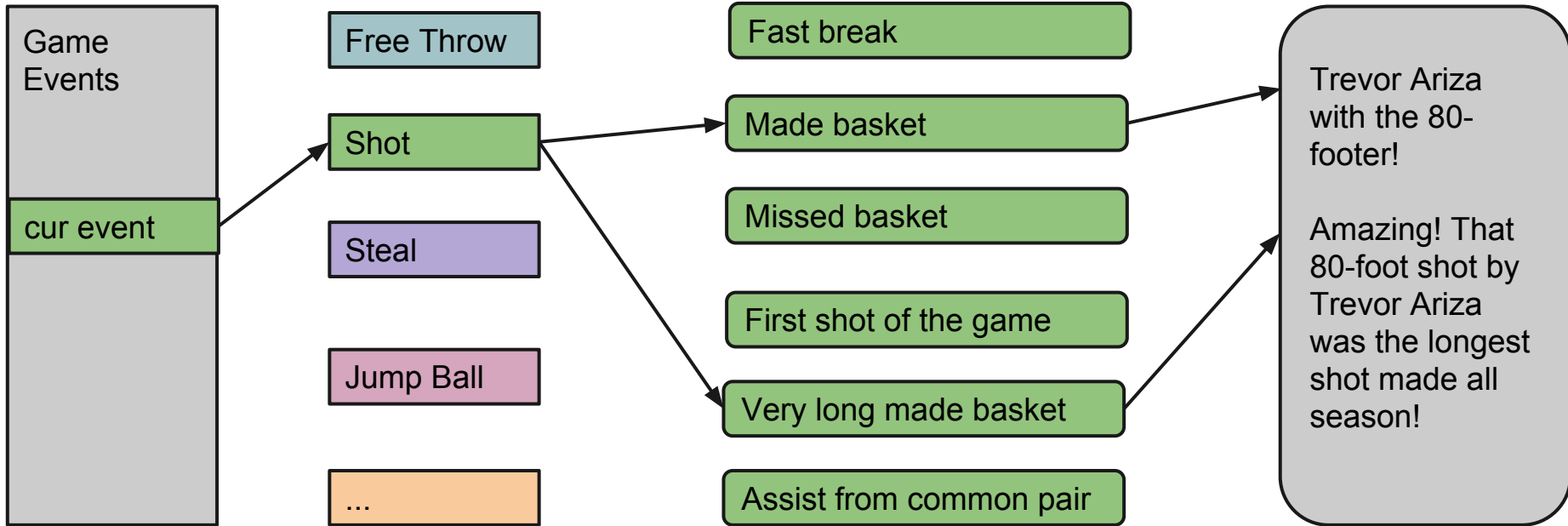
# Bidding Structure

Event Iterator

Events

Bidding functions

Commentary



# Demo

# Testing

## Comments from friends who viewed our results

### Pros:

- Interesting stats and facts included on top of generic play by play.
- Good references to previous games (team winning streak)

### Cons:

- Sparse, added commentary fairly short and not lots of combinations.
- Commentary about players is general the same, no awareness for consistently good players.

# Next Further Improvements

- Adding more combinations of ways to state plays/facts (Our infrastructure for this good, very easy to add more)
- Half-time and full-time recap summaries (Systems like this are currently used for college and professional sports)

# Questions?

